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05/10/99

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No: 28572/32531A

CONTINUING APPLICATION TRANSMITTAL UNDER 37 CFR 1.53(b)

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

This is a request under 37 CFR 1.53 for filing a

- continuation application.
 divisional application.

1. Particulars of Prior Application

Application Serial No: 08/844,734
Filed on: 22 April 1997
Title: LOW PRESSURE MELAMINE/VENEER PANEL AND
METHOD OF MAKING THE SAME

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Continuing Application Transmittal Under 37 CFR 1.53(b) and the documents referred to as enclosed therewith are being deposited with the United States Postal Service on **May 10, 1999**, in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231 utilizing the "Express Mail Post Office to Addressee" service of the United States Postal Service under Mailing Label No. EM401479615US.

Richard Zimmermann

2. This request is filed by:

1. Full Name of Inventor	Family Name Rakauskas	First Given Name Michael	Second Given Name E.
Residence & Citizenship	City Oshkosh	State or Foreign Country Wisconsin	Country of Citizenship Winnebago
Post Office Address	Post Office Address 1888 Emily Anne Drive	City Oshkosh	State & Zip Code/Country Wisconsin, 54904

3. Amendments

- A Preliminary Amendment is enclosed.

4. Copy of Prior Application

The enclosed is a copy of the prior complete application, including the specification (with claims), drawings, the oath or declaration, and any amendments referred to in the oath or declaration filed to complete the prior application.

5. Incorporation By Reference

The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under paragraph 4, above, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. Assignment

The prior application is assigned of record to International Paper Company, and has been recorded at Reel No. 8865, Frame No. 181.

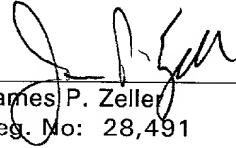
This application is being filed without a filing fee.

Please direct all future communications to James P. Zeller, at the address below.

Respectfully submitted,

MARSHALL, O'TOOLE, GERSTEIN,
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By:


James P. Zeller
Reg. No: 28,491

May 10, 1999

**IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE**

Applicant: Michael E. Rakauskas)
)
Serial No.: To be determined)
)
Filed: May 10, 1999)
 (Herewith)
)
Title: LOW PRESSURE)
 MELAMINE/VENEER PANEL)
 AND METHOD OF MAKING)
 THE SAME)
)
Division of U.S. Serial No. 08/844,734)
filed April 21, 1997.)
)
Group Art Unit: To be determined)
)
Examiner: To be determined)
)
Attorney Docket #: 28572/32531A)

PRELIMINARY AMENDMENT

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please amend the above-identified application as follows.

In The Title:

Please cancel the present title and substitute --LOW PRESSURE
MELAMINE/VENEER PANEL-- therefor.

In The Specification:

At page 1, after the title please insert the following:

--CROSS-REFERENCE TO RELATED APPLICATION

This is a division of U.S. Patent Application Serial No.
08/844,734 filed April 21, 1997.--

In The Claims:

Please cancel claims 1-13, 15, and 16, without prejudice.

Please amend claim 14 as follows:

14. (Amended) A laminated composite wood product made by [the]
a method [of claim 1] comprising the steps of:

(a) forming a layered structure comprising a rigid substrate layer
having two substantially flat sides, a resin-saturated sheet layer disposed on
each of said sides, and a veneer layer disposed on at least one of said sheet
layers; and,

(b) subjecting said structure to elevated temperature and pressure in
a pressing apparatus for a time sufficient to cure said resin at said temperature
and pressure.

REMARKS

By the foregoing amendments, the title has been amended for
consistency with the scope of the claims, and a cross-reference to the allowed parent
application has been inserted.

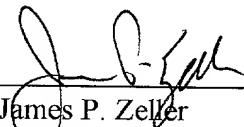
Claims 1-13, 15, and 16 have been canceled, without prejudice. Claims 14 and 17-25 remain and were identified as Group II in parent Application Serial No. 08/844,734 filed April 21, 1997.

Respectfully submitted,

MARSHALL, O'TOOLE, GERSTEIN,
MURRAY & BORUN

May 10, 1999

By:



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SOLE INVENTOR

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Date of Deposit: May 10, 1999

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Assistant Commissioner for Patents,
Washington, D.C. 20231



Richard Zimmermann

**APPLICATION FOR
UNITED STATES LETTERS PATENT**

S P E C I F I C A T I O N

TO ALL WHOM IT MAY CONCERN:

**Be it known that I, Michael E. Rakauskas, residing at 1888
Emily Anne Drive, Oshkosh, Winnebago County, Wisconsin 54904 have
invented a new and useful LOW PRESSURE MELAMINE/VENEER PANEL AND
METHOD OF MAKING THE SAME, of which the following is a specification.**

LOW PRESSURE MELAMINE/VENEER PANEL
AND METHOD OF MAKING THE SAME

BACKGROUND OF THE INVENTION

Field of the Invention

5 The invention relates generally to pressure laminated wood products and methods of making the same. More specifically, the invention relates to low-pressure laminated wood products and a method of securing decorative veneers to core substrates using resin-saturated sheets.

Brief Description of Related Technology

15 Layered, composite wood structures having an inner core substrate and veneer layers affixed to one or more major planer surfaces of the inner core substrate are well-known in the art. Such composite wood structures exhibit the desirable characteristics of the veneer material while providing a cost savings over a solid structure made entirely of the veneer material.

20 For example, a natural hardwood veneer, such as oak, may be secured to a less expensive substrate, such as high density fiberboard, to produce a composite panel article. The composite wood structures serve a variety of uses, such as floorboards, doors, cabinets, countertops, and walls, to name a few. Veneers used in forming the composite wood structures are selected from a wide variety of wood materials depending upon economic considerations and the end-use of the structure. Typical woods used as veneers in the past have included ash, birch, cherry, maple, oak, pine, poplar, and walnut.

25 Wood veneers may be secured to core substrates by lamination processes using resin binders in the form of resin-coated papers. Commonly used resins include thermosetting materials, such as melamine resins.

30 Melamine resins, also known in the art as melamine/formaldehyde resins, typically exist in aqueous solution, although alcohols or other organics may also be

used as solvents. A melamine-coated paper can be dried to remove water and/or solvent leaving a dry, solid state melamine-coated paper.

As described in *Kirk-Othmer's Encyclopedia of Chemical Technology*, Volume 14, pgs. 1074-91 (1995), a resin-coated paper may be placed between a veneer sheet and an inner core substrate to form a layered, composite wood structure. This layered structure is then heated in a compression molding press at a temperature of 130°C (266°F) to 150°C (302°F) for 20 minutes to 40 minutes. The initial heating causes the resin to melt and flow into the voids and pores of the core substrate and the veneer sheet. With a sufficiently long press cycle, the resin polymerizes and crosslinks into an intractable network structure (a thermoset) bonding the core substrate to the veneer. After heating, the structure is cooled while in the press under pressure, and thereafter may undergo finishing operations, such as trimming and/or sanding, to form the final product.

Thermosetting materials, such as melamine, have been used due to their superior resistance to discoloration when subjected to the conventional lamination temperatures and their exceptional bonding strength. Layered wood composite structures made by a conventional compression molding press processes, as described above, however, may experience excessive warpage toward the veneer side.

Wood veneer and substrate materials generally contain moisture. Changes in moisture content as a result of changes in atmospheric moisture conditions and wetting of the wood surface(s) by water generally tend to cause wood materials to warp or blister. The type of manufacturing process also may influence the moisture content of the formed wood product and thereby affect warpage. Thus, the original moisture content of the veneer and substrate, as well as the amount of water added by the aforementioned binder, must be maintained

low to avoid warp and/or blistering of the wood materials. During heat curing and/or pressing of the wood materials, water evaporates from the wood materials. This evaporation may impart stresses in the wood
5 materials, causing them to warp. The evaporation of additional moisture from the binder used to secure the various wood materials together may also contribute to wood warpage.

Balancing veneer or heavy duty backer paper
10 have been used in the past to balance, or offset, the wood warping problem. In this case, where a veneer layer is placed on both faces of a substrate, any tendency of the wood materials to warp effectively cancel each other out. However, the use of this additional veneer as well
15 as board production is unnecessarily expensive where a second veneer serves no cosmetic purpose. Furthermore, a second veneer is often not desired in certain applications, such as store display boxes (e.g., jewelery display cabinets).

20 Thus, it would be desirable to have a cost-efficient process for making a laminated wood structure wherein the amount of warpage is drastically reduced, if not eliminated altogether.

25 **SUMMARY OF THE INVENTION**

It is an object of the invention to overcome one or more of the problems described above.

According to the invention, a method of making a laminated composite article includes the steps of (a)
30 forming a layered structure comprising a rigid substrate layer having two substantially planar sides, a resin-saturated paper layer disposed on each of the substantially planar sides, and a veneer layer disposed on at least one of the paper layers; and, (b) subjecting
35 the structure to elevated temperature and pressure in a pressing apparatus for a press cycle time of about one minute or less.

The invention provides a laminated wood composite article comprising a rigid substrate layer having two substantially flat sides, one resin-saturated paper layer on each of the substantially flat sides, and 5 a veneer layer on at least one of the paper layers.

Other objects and advantages of the invention will be apparent to those skilled in the art from a review of the following detailed description, taken in conjunction with the drawing and the appended claims.

10

BRIEF DESCRIPTION OF THE DRAWING

The sole figure is a partial, cross-sectional view of a laminated composite wood article according to the invention.

15

DETAILED DESCRIPTION OF THE INVENTION

According to the invention, a method of making a low pressure melamine/veneer panel is provided, the method generally including forming a composite wood 20 structure including a rigid substrate layer having two substantially planar sides, a resin saturated paper layer disposed on each of the substantially planar sides of the substrate, and a veneer layer disposed on at least one of the paper layers. The composite wood structure is 25 subjected to elevated heat and pressure in a pressing apparatus for a press cycle time of about one minute or less.

According to a preferred embodiment of the inventive method, there is initially provided a substrate 30 having a top planar surface and a bottom planar surface. A surface of a resin-impregnated (or resin-saturated) low pressure laminate (hereafter "LPL") sheet is placed in contact with the top surface of the substrate, and another surface of the resin-impregnated sheet is placed 35 in contact with a surface of a wood veneer sheet. A second resin-impregnated sheet is placed in contact with

the bottom surface of the substrate, which is opposite (and parallel) to the top surface of the substrate.

Referring to the drawing, a partial, cross-sectional view of a laminated wood structure, generally 5 designated 10, according to an embodiment of the invention is illustrated. The structure 10 includes a veneer sheet 12, a first resin-impregnated LPL sheet 14, a core substrate 16, and a second resin-impregnated LPL sheet 18. The structure 10 includes a core substrate 16 10 sandwiched between the first and second resin-impregnated LPL sheets 14 and 18, respectively, and a veneer sheet 12 overlying the first resin-impregnated LPL sheet 14. The layered structure 10 is laminated under heat and pressure according to the method described below to form a 15 laminated composite wood article.

Suitable substrate materials for use in the laminated composite articles of the invention include various wood materials, such as particleboard and low-, medium-, and high-density fiberboard. Preferably, 20 however, the substrate is a medium-density fiberboard having a density of about 45 pounds per cubic foot (lbs/ft³) and 65 lbs/ft³.

Generally, any sheet- or paper-like material can be used as the LPL layers of the inventive composite, 25 so long as the material can be impregnated or saturated with a suitable resin composition. Suitable materials may be prepared from cellulosic fibers, such as creped or uncreped kraft paper and the like, and alpha-cellulose sheet material. These sheets are typically regenerated 30 cellulose paper, or similar fibrous material. It is preferable, however, to use an alpha cellulose sheet material. Furthermore it is preferred to use an alpha cellulose sheet having a basis weight in the range of about 40 pounds per ream to about 100 pounds per ream 35 (about 18 kilograms per ream to about 45 kilograms per ream).

The resin of the resin-impregnated LPL sheet comprises a melamine resin, and preferably comprises either (a) a melamine/urea blend and additives, or (b) about 98 wt.% melamine with trace concentrations of 5 additives. A preferred melamine/urea blend includes one comprising about 60 wt.% melamine and about 40 wt.% urea based on the total weight of the resin composition. However, other blends of melamine and urea also can be used. Additives comprising the resin composition include 10 one or more catalysts to control resin rate of cure, wetting agents, internal release agents, and plasticizers. Typically, the total concentration of additives comprising the resin composition is about 2 wt.% or less based on the total weight of the resin 15 composition.

The impregnation of the LPL sheet generally is achieved by transforming the resin composition into a solution with a suitable organic solvent and/or water, and by applying the resultant solution to the sheet or by 20 immersing the sheet into the resultant solution. In order to minimize formaldehyde emissions in subsequent heating and drying steps, it is preferable to saturate (as opposed to simply coat) the sheet with the resultant solution. After the sheet has been saturated with the 25 resultant solution, the sheet is preferably dried at room temperature or under application of heat to effect the expulsion of the volatile organic component and/or water to the fullest extent possible. Some polymerization occurs during this volatilization step. Suitable ovens 30 that can be used to accomplish this drying step are air flotation ovens.

By drying the sheet by the foregoing procedure a resin-impregnated (also referred hereafter as a "resin-saturated") sheet is formed, which contains the resin in 35 a dry, solid state. The concentration of resin in the resin-impregnated sheet is preferably in the range of about 50 wt.% to about 65 wt.% based on the total weight

of the resin-impregnated sheet. The pH of the resin saturating the LPL sheet is about 8.0 to about 9.5, and preferably is about 8.5 to about 9.0. The moisture content of the resin in the sheet is preferably about 5 wt.% to about 8 wt.% based on the weight of the resin-impregnated sheet, and more preferably is about 7 wt.% based on the weight of the resin-impregnated sheet.

Any wood-like material is suitable as a veneer material for use according to the invention. Such 10 materials include softwood materials, man-made wood veneers, and hardwood materials, wood composite materials, and high pressure laminates, such as a composition of a phenolic resin-impregnated kraft sheet covered by a melamine decorative sheet. Suitable wood 15 composite materials include softboard, medium density fiberboard, hardboard, particleboard, plywood, and waferboard. The moisture content of the veneer materials is preferably in the range of about 7 wt.% to about 10 wt.% based on the weight of the veneer, and more 20 preferably should be between about 8 wt.% to about 9 wt.% based on the weight of the veneer.

The layered structure is subjected to heat and pressure in a pressing apparatus including a first platen and a second platen. Each platen, optionally, may 25 contain caul plates which are often used to impart a pattern to the wood or resin-impregnated sheet. Furthermore, the pressed structure also has a reduced tendency to adhere to the caul plates compared to the platens.

30 The layered structure is arranged in the pressing apparatus such that during pressing the first platen is in thermal contact with the veneer layer. The first platen preferably has a temperature of about 350°F (177°C) to about 405°F (207°C), and preferably has a 35 temperature of about 375°F (190°C) to about 385°F (196°C). The second platen preferably has a temperature of about 320°F (160°C) to about 350°F (177°C), and preferably has a

temperature of about 335°F (168°C) to about 340°F (171°C). The first and second platens preferably compress the layered wood structure at a pressure of about 325 psi to about 425 psi, more preferably about 350 psi to about 380 5 psi, for a pressing period sufficient to cure the resin at the aforementioned temperatures and pressures. Preferably, the pressing period is about 60 seconds or less, more preferably about 50 seconds or less, and most preferably about 30 seconds to about 40 seconds. The 10 foregoing press cycle conditions of time, temperature, and pressure, allow the resin to sufficiently cure and form strong bonds between (a) the LPL sheet and the substrate and (b) between the LPL sheet and the veneer.

An important feature of the invention is the 15 simultaneous lamination of the resin-impregnated LPL sheets to both top and bottom surfaces of the substrate material. This simultaneous lamination ensures minimal warpage of the substrate material and further ensures minimal water penetration into the substrate. The use of 20 a resin-impregnated LPL sheets according to the invention also substantially prevents the evaporation of water from the wood itself, thereby minimizing wood warpage.

It has been found that the rate of resin cure also serves to control the occurrence of wood warpage. 25 Thus, press temperatures and catalyst concentrations in the resin help fine-tune the elimination of wood warpage. For example, the higher the press temperature, the higher the tendency of the wood to warp. Therefore, press temperatures (for each of the first platen and second 30 platen) are carefully selected to account for any tendencies of the wood materials to experience warpage based on the catalyst concentration. The tendency of the wood to warp toward the veneer side is offset by the catalyst concentration of the resin in the bottom LPL 35 sheet as well as the temperature of the platen in thermal contact with the LPL sheet.

Example

A 1/32 inch (0.079 cm) maple veneer having a moisture content of about 7 wt.% was laminated to a first major planar surface an 11/16 inch (1.75 cm) thick industrial grade particleboard. One 67 pounds per ream (30.4 kilograms per ream) resin-saturated white paper (alpha cellulose), having a resin content of about 62 wt.% resin content and about 7.5 wt.% organics content, was placed between the veneer and the first major planar surface of the particleboard. A second, equivalent resin-saturated white paper was place on a second major planar surface of the particleboard. Thus, the layered wood structure has a configuration as shown in the sole drawing figure.

The layered wood structure is placed in a single-opening, hot oil heated pressing apparatus having a first (top) platen, a caul plate affixed to the first platen, and a second (bottom) platen, wherein the caul plate of the first platen is in thermal contact with the veneer layer, and the second platten is in thermal contact with the second resin-saturated white paper. The apparatus subjected the layered wood structure heat and pressure. The first (top) platen (and caul plate) was maintained at a temperature of about 350°F, the second (bottom) platen was maintained at a temperature of about 320°F, at a pressure of about 380 psi for a press cycle time of about 55 seconds. The resultant panels were relatively flat and passed an ANSI Hardwood Plywood & Veneer Association (HPVA) Type 1 glue bond line test.

The foregoing detailed description is provided for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as modifications within the scope of the invention will be apparent to persons of ordinary skill in the art.

CLAIMS:

1. A method of producing a laminated composite article, said method comprising the steps of:

5 (a) forming a layered structure comprising a rigid substrate layer having two substantially flat sides, a resin-saturated sheet layer disposed on each of said sides, and a veneer layer disposed on at least one of said sheet layers; and,

10 (b) subjecting said structure to elevated temperature and pressure in a pressing apparatus for a time sufficient to cure said resin at said temperature and pressure.

15 2. The method of claim 1, wherein said pressing apparatus comprises a first platen and a second platen, said first platen having a temperature of about 350°F to about 405°F, and said second platen having a temperature of about 320°F to about 350°F.

20 3. The method of claim 1, wherein said pressing apparatus subjects the structure of step (a) to a pressure of about 325 psi to about 425 psi.

25 4. The method of claim 1, wherein said time is about one minute or less.

5. The method of claim 1, wherein said time is about 30 seconds to about 40 seconds.

30 6. The method of claim 1, wherein said resin of said resin-saturated sheet is a material comprising melamine.

35 7. The method of claim 6, wherein said resin of said resin-saturated sheet is a material comprising about 98 wt.% melamine.

8. The method of claim 6, wherein said resin of said resin-saturated sheet is a material comprising a melamine/urea blend.

5 9. The method of claim 8, wherein said resin of said resin-saturated sheet is a material comprising about 60 wt.% of melamine and about 40 wt.% of urea.

10 10. The method of claim 6, wherein said resin comprises about 45 wt.% to about 65 wt.% of the resin-saturated sheet.

15 11. The method of claim 1, wherein said sheet of said resin-saturated sheet is an alpha cellulose sheet having a basis weight of about 40 pounds per ream to about 100 pounds per ream.

20 12. The method of claim 1, wherein said rigid substrate layer is a material selected from the group consisting of particleboard, low-density fiberboard, medium-density fiberboard, and high-density fiberboard.

25 13. The method of claim 1, wherein said veneer layer comprises a wood-like material having a moisture content of about 7 wt.% to about 10 wt.% based on the weight of the veneer.

30 14. A laminated composite wood product made by the method of claim 1.

15. A method of producing a composite article, comprising the steps of:

(a) providing a rigid substrate layer having two substantially flat sides;

35 (b) providing, on each of said sides of the substrate layer, a sheet layer that is substantially saturated with a thermosetting resin;

- (c) providing, on at least one of said sheet layers, a veneer layer;
- (d) providing the product of step (c) in a pressing apparatus; and
- 5 (e) subjecting the product of step (d) to elevated heat and pressure in said pressing apparatus for a period sufficient to cure said resin at said temperature and pressure.

10

16. The method of claim 15, wherein:
the product of step (c) is provided in a pressing apparatus including a first platen and a second platen; and,

15

in step (e) said first platen has an elevated temperature in the range of about 350°F to about 405°F, and said second platen has an elevated temperature in the range of about 320°F to about 350°F.

20

17. A laminated composite wood product comprising a rigid substrate layer having two substantially flat sides, a resin-saturated sheet layer on each of said substantially flat sides, and a veneer layer on at least one of said sheet layers.

25

18. The product of claim 17, wherein said resin of said resin-saturated sheet is a material comprising melamine.

30

19. The product of claim 18, wherein said resin of said resin-saturated sheet is a material comprising about 98 wt.% melamine.

35

20. The product of claim 18, wherein said resin of said resin-saturated sheet is a material comprising a melamine/urea blend.

21. The product of claim 20, wherein said resin of said resin-saturated sheet is a material comprising about 60 wt.% of melamine and about 40 wt.% of urea.

5

22. The product of claim 18, wherein said resin comprises about 45 wt.% to about 65 wt.% of the resin-saturated sheet.

10

23. The product of claim 17, wherein said sheet of said resin-saturated sheet is an alpha cellulose sheet having a basis weight of about 40 pounds per ream to about 100 pounds per ream.

15

24. The product of claim 17, wherein said rigid substrate layer is a material selected from the group consisting of particleboard, low-density fiberboard, medium-density fiberboard, and high-density fiberboard.

20

25. The product of claim 17, wherein said veneer layer comprises a wood-like material having a moisture content of about 7 wt.% to about 10 wt.% based on the weight of the veneer.

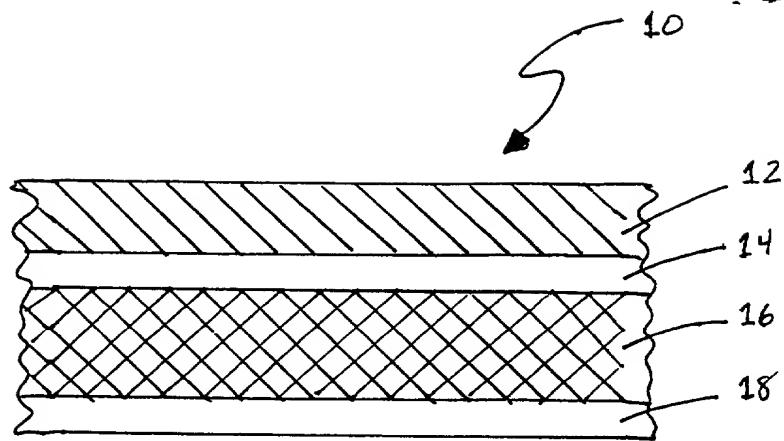
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LOW PRESSURE MELAMINE/VENEER PANEL
AND METHOD OF MAKING THE SAME

ABSTRACT

A layered composite product for use as a
5 floorboard, a door, a cabinet, a wall, etc. is disclosed.
The product is a layered structure that includes a rigid
substrate layer having two substantially planar sides, a
resin-saturated sheet layer disposed on each of the
substantially flat sides, and a veneer layer disposed on
10 at least one of the sheet layers. Also provided is a
method of making the aforementioned product, the method
comprising the steps of forming the layered structure,
and then compressing the structure in a pressing
apparatus for a time sufficient to cure the resin at
15 under heat and pressure.

1/1



DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled "**Low Pressure Melamine/Veneer Panel and Method of Making the Same,**" the specification of which was filed on April 21, 1997 as Application Serial No. 08/844,734. I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose to the Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. §1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

			Priority Claimed
(Application Serial Number)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/> <input type="checkbox"/>
			Yes No

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below:

(Application Serial Number)	(Day/Month/Year Filed)
-----------------------------	------------------------

I hereby claim the benefit under 35 U.S.C. §120 of any United States application(s) or PCT international application(s) designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior application(s) in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in 37 C.F.R. §1.56 which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

(Application Serial Number)	(Day/Month/Year Filed)	(Status-Patented, Pending or Abandoned)
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: I hereby appoint as my attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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Owen J. Murray (22,111)
Allen H. Gerstein (22,218)
Nate F. Scarpelli (22,320)
Edward M. O'Toole (22,477)
Michael F. Borun (25,447)
Trevor B. Joike (25,542)

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James P. Zeller (28,491)
William E. McCracken (30,195)

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Jeffrey S. Sharp (31,879)
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Second Joint Inventor, if any	Citizenship
Residence Address - Street	Post Office Address - Street
City (Zip)	City (Zip)
State or Country	State or Country
Date <input checked="" type="checkbox"/>	Signature <input checked="" type="checkbox"/>

Third Joint Inventor, if any	Citizenship
Residence Address - Street	Post Office Address - Street
City (Zip)	City (Zip)
State or Country	State or Country
Date <input checked="" type="checkbox"/>	Signature <input checked="" type="checkbox"/>

Fourth Joint Inventor, if any	Citizenship
Residence Address - Street	Post Office Address - Street
City (Zip)	City (Zip)
State or Country	State or Country
Date <input checked="" type="checkbox"/>	Signature <input checked="" type="checkbox"/>

APPLICABLE RULES AND STATUTES

37 CFR 1.56. DUTY OF DISCLOSURE - INFORMATION MATERIAL TO PATENTABILITY (Applicable Portion)

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is canceled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and
(2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentability defines, to make sure that any material information contained therein is disclosed to the Office.

Information relating to the following factual situations enumerated in 35 USC 102 and 103 may be considered material under 37 CFR 1.56(a).

35 U.S.C. 102. CONDITIONS FOR PATENTABILITY: NOVELTY AND LOSS OF RIGHT TO PATENT

A person shall be entitled to a patent unless --

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or
 - (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or
 - (c) he has abandoned the invention, or
 - (d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States, or
 - (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraph (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent, or
 - (f) he did not himself invent the subject matter sought to be patented, or
 - (g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

35 U.S.C. 103. CONDITIONS FOR PATENTABILITY; NON-OBVIOUS SUBJECT MATTER (Applicable Portion)

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

35 U.S.C. 112. SPECIFICATION (Applicable Portion)

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.